

Country Report Finland

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Finland Has Become a Heat Pump Superpower

De-electrify our electric heating with HPs

Get rid of our oil heating with HPs

On the long run get rid of burning biomass in District Heating with HPs

Finland



Facts about **the Happiest Country in the World**

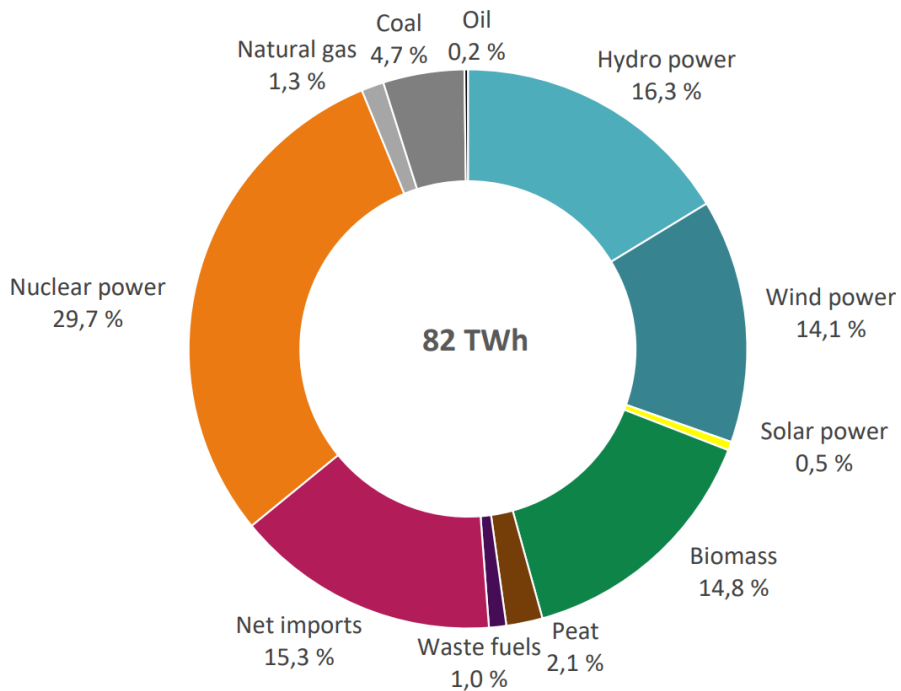
- 5,5 million population
- 338 440 km²,
- GDP 45 372 €

- 80 TWh/a, heating of buildings
- 80 TWh/a, consumption of electricity, peakload 15 000 MW
- No gas grid

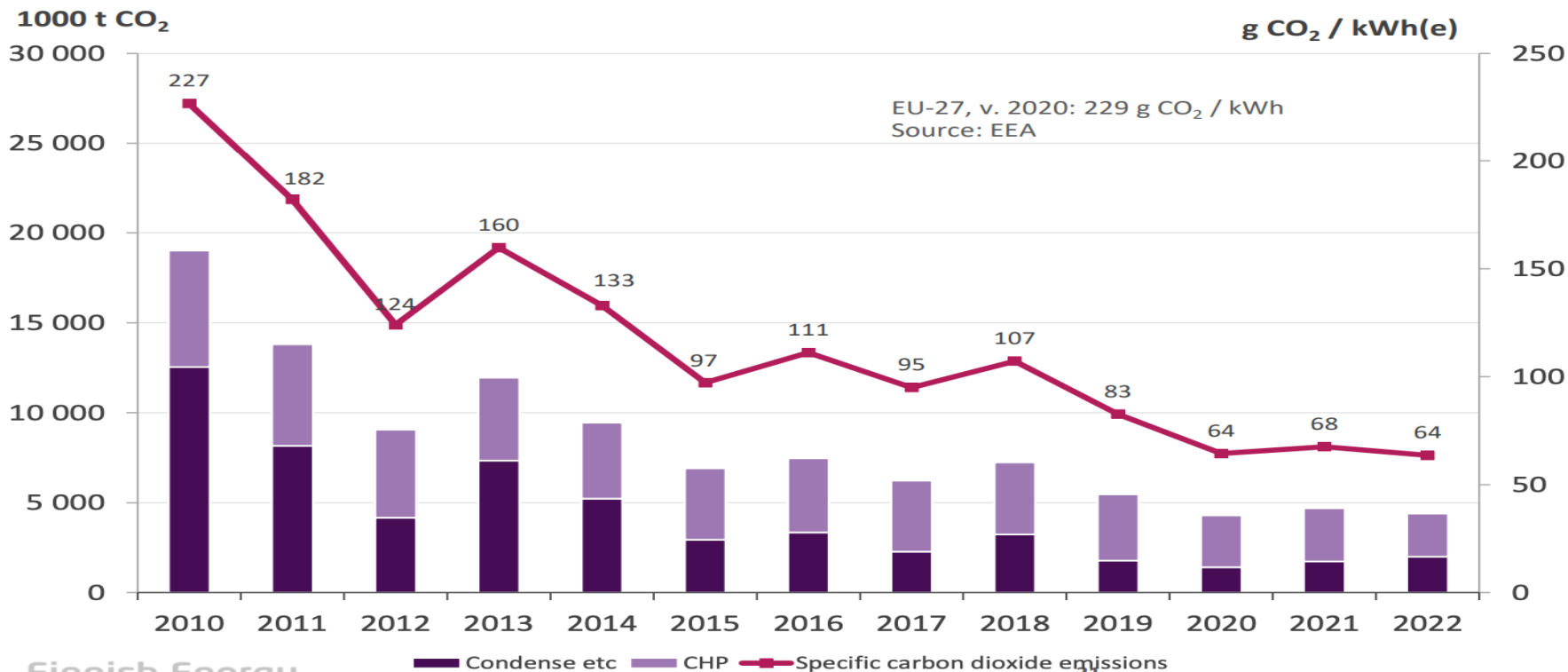
- 1,2 million single family houses
- 0,5 million free time houses

- 190 000 lakes

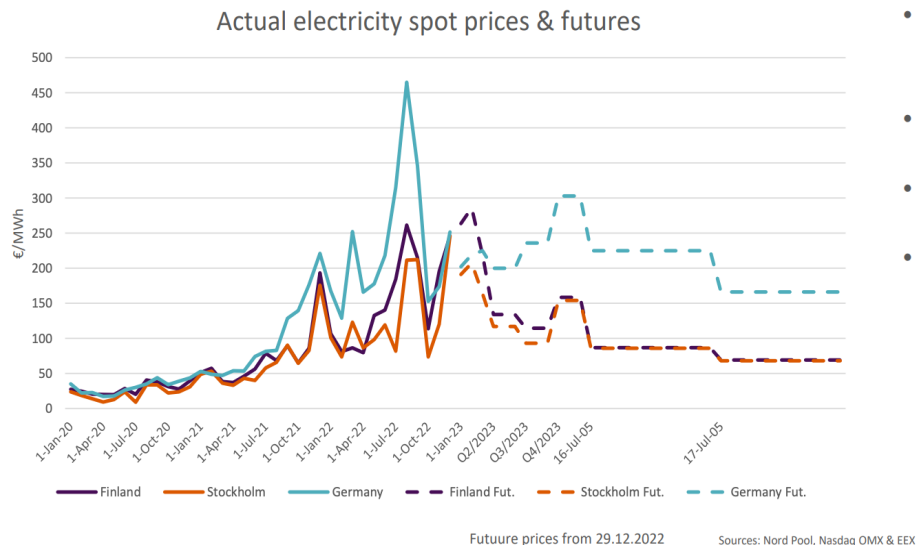
ELECTRICITY PRODUCTION 2022



CO₂-EMISSIONS OF POWER GENERATION



Outlook for electricity prices is promising especially in terms of Finland and Sweden



- Future electricity deliveries are traded on the electricity derivatives market.
- The price outlook is declining in Finland and Sweden.
- In Germany, high prices seem to be continuing.
- The situation in Finland and Sweden is explained by the fact that we have a constant plentiful supply of new electricity production. Moreover, we are not dependent on gas in electricity production which would keep prices at a constantly high level.

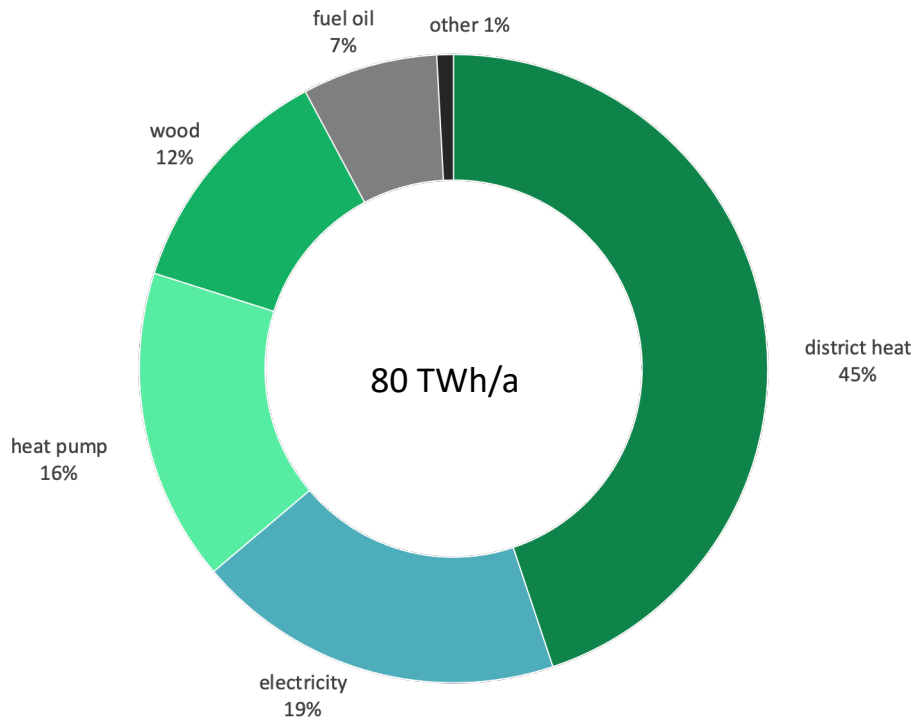
NOTE:

Smart electricity metering in every household

Spot price tariff more and more common

MARKET SHARE OF SPACE HEATING

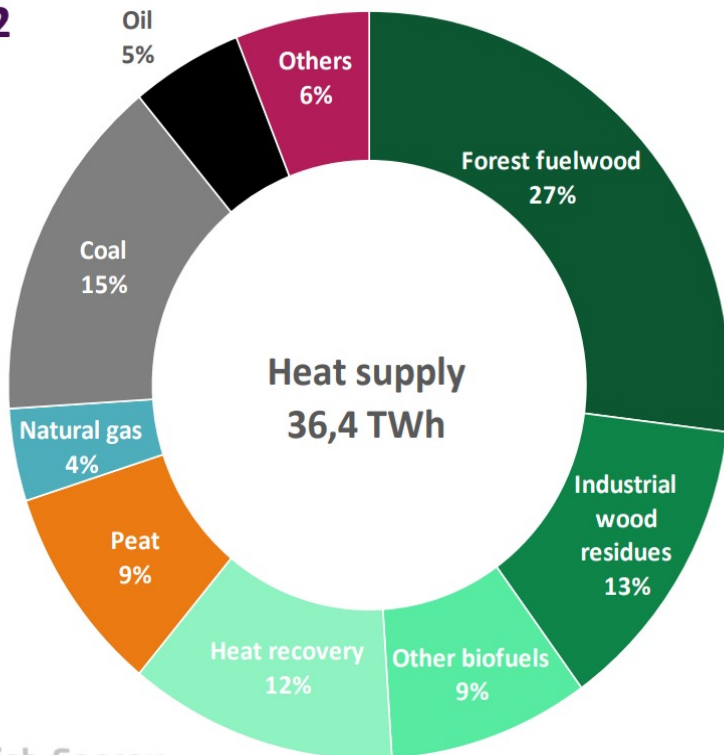
RESIDENTIAL, COMMERCIAL AND PUBLIC BUILDINGS



Heat pump: includes the electricity consumption of heat pumps
Electricity: includes the electricity consumption of heat distribution equipment and electric sauna stoves
Wood: includes the wood used by sauna stoves

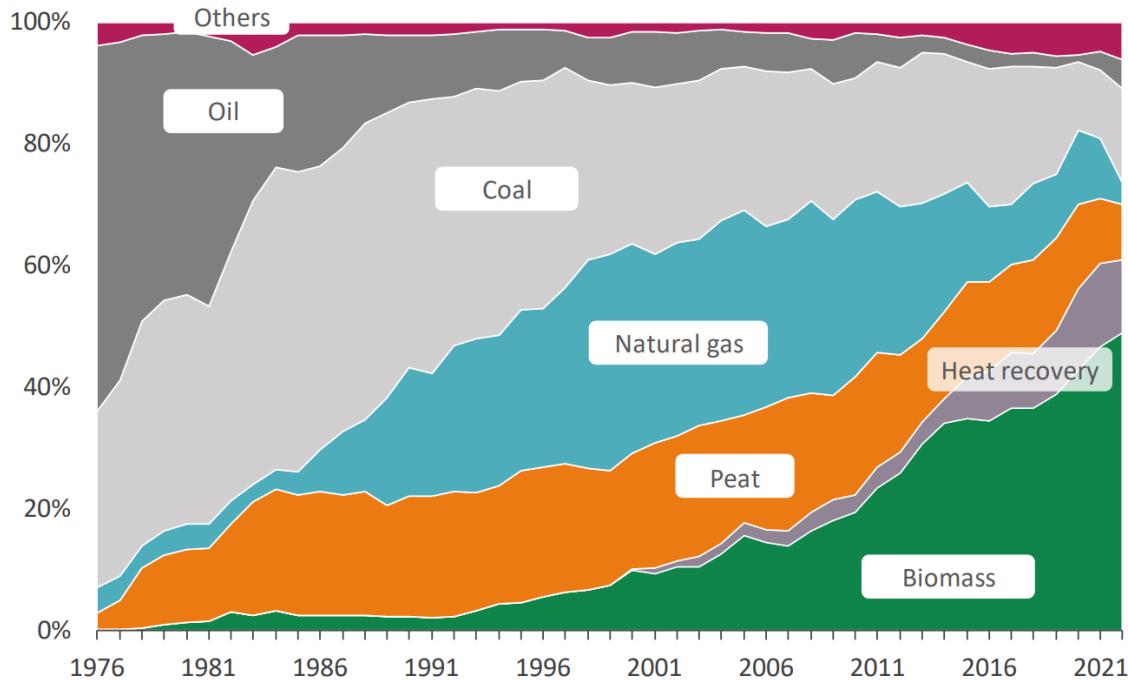
ENERGY SOURCES OF DISTRICT HEATING (2022)

2022



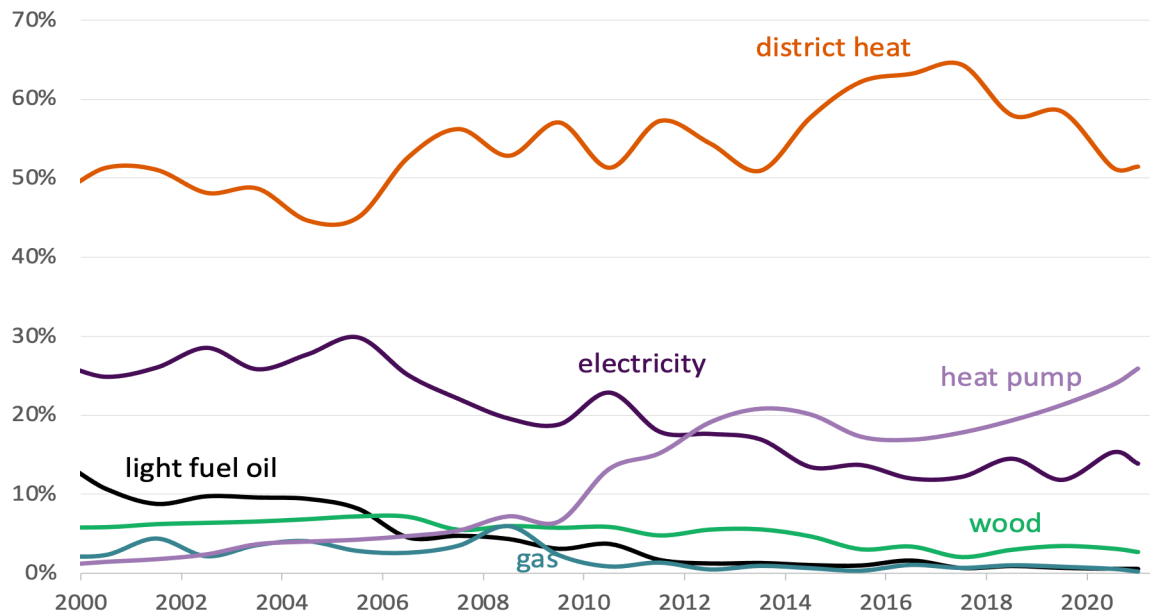
- Recovered (recycled) heat: energy that would otherwise go to waste
- Other biofuels: includes also the bio share of municipal waste
- Other: non-bio share of municipal waste, plastic or hazardous waste, electricity.

Share of renewables and recovered heat well more than a half in district heat supply



- Fossil fuels have increasingly been replaced by biomass and recovered heat.
- Use of biomass has more than doubled during last decade.
- Amount of recovered heat has more than tripled since 2010. Recovered heat consists mainly of waste heat. Fuel consumption is avoided by making use of surplus heat.

HEATING CHOICES IN NEW BUILDINGS



Source: Statistics Finland, Granted building permits (heated cubic volume)

www.heatpumpingtechnologies.org

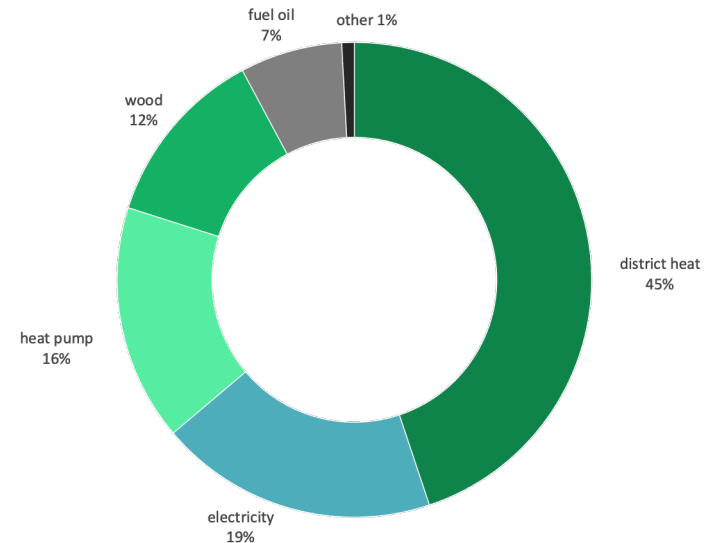
Finnish Energy



Heat Pumps has been a glorious story in Finland

- Heat Pump sector is big, 14 TWh/a, 16 % of the heating of Finland (80 TWh/a) (+DH production with HPs)
- Investments in 1,5 million heat pumps, already 8 billion euros
- Investment level now about 1 billion/a in 200.000 HPs/a increase of about 1 TWh/a HP heat production
- Market-based business, investments made mainly by private consumers, subsidizing level modest

Market shares of space and DHW heating (~80TWh/a)

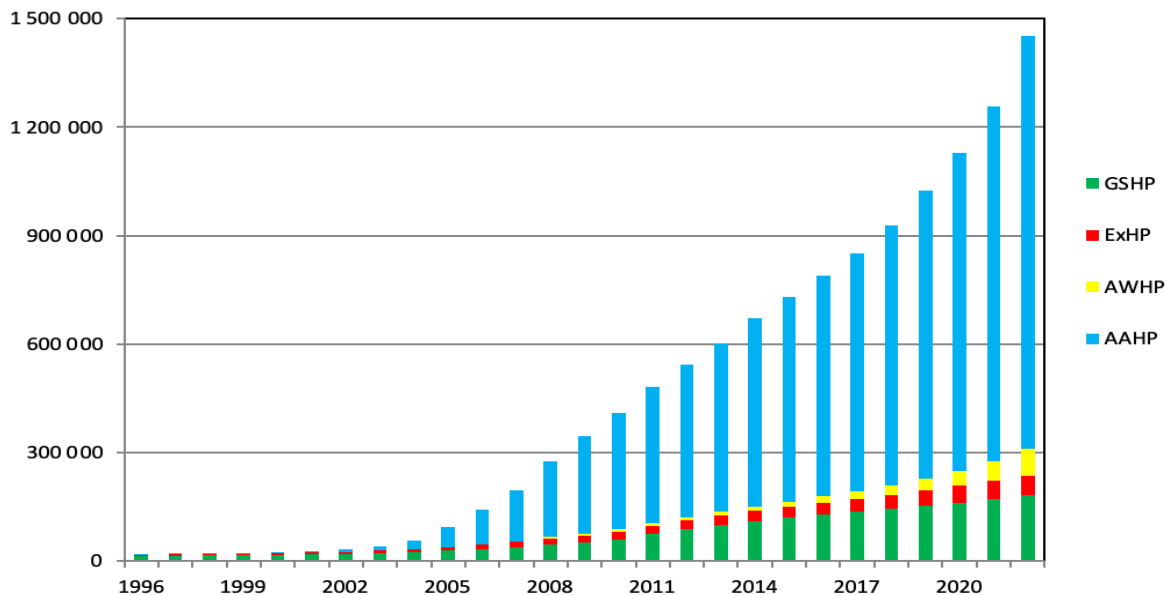


Source: Finnish Energy, 2021

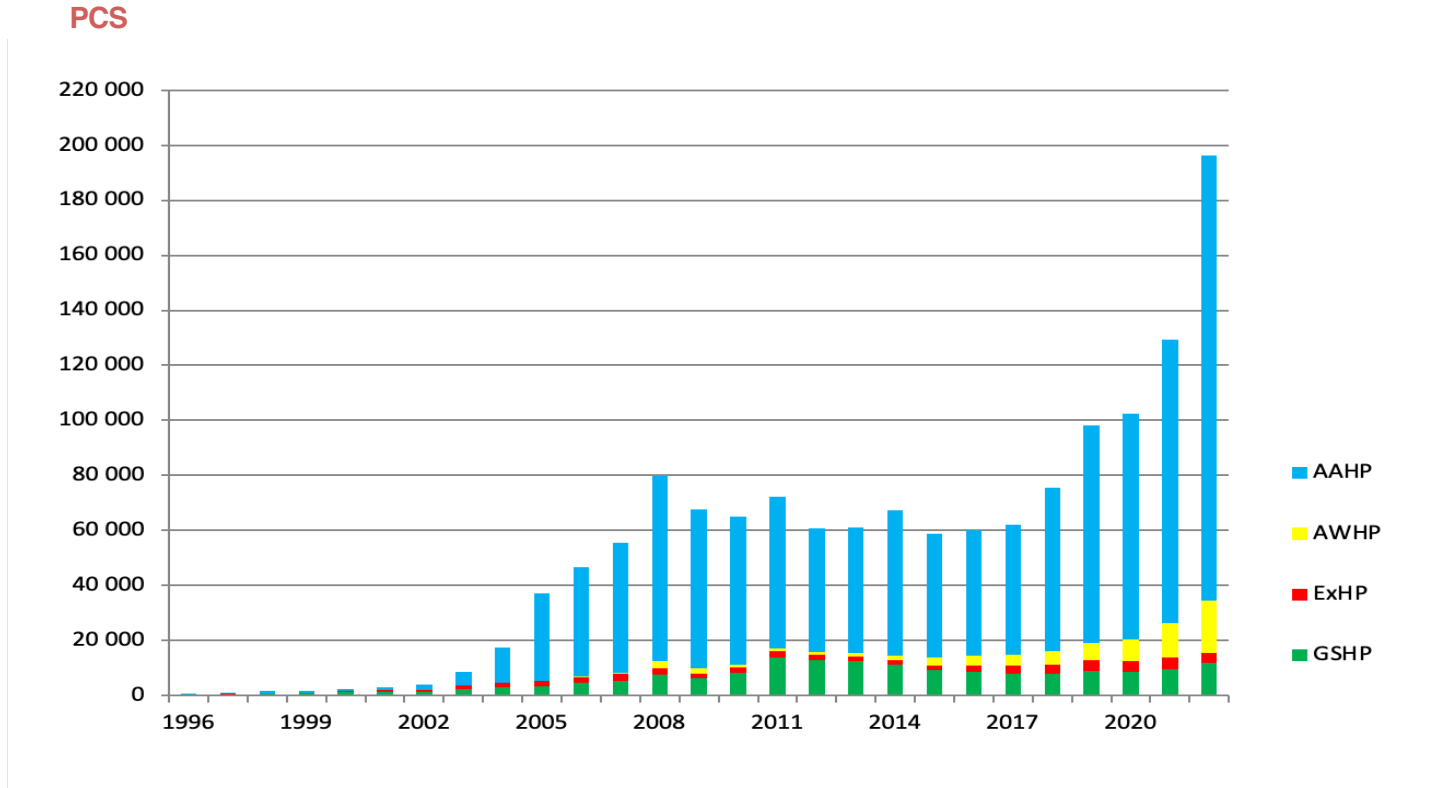
CUMULATIVE HEAT PUMP SALES IN FINLAND (PCS)

(MEGAWATT-SIZE DISTRICT HEATING/COOLING , SHOPPING CENTER, SERVICE BUILDING , INDUSTRIAL HPS AS WELL AS PLANNING , SERVICE, ETC. ARE MISSING FROM FIGURES BELOW)

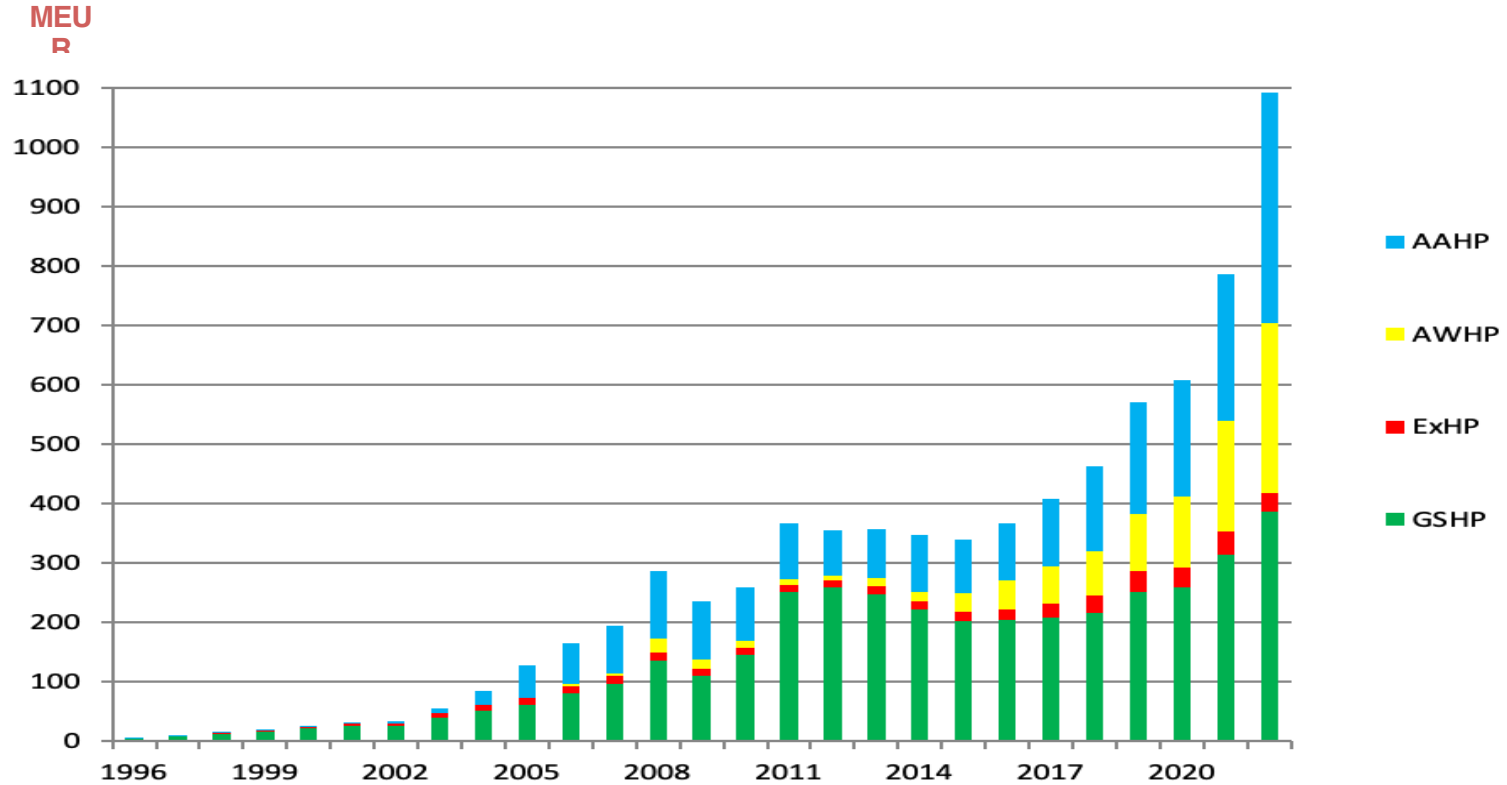
PCS



ANNUAL HEAT PUMP INSTALLATIONS IN FINLAND (PCS)



ANNUAL HEAT PUMP INVESTMENTS IN FINLAND (MEUR)



Average investment: GSHP 33.000€, AWHP 15.000€, EAHP 9.000€, AAHP 2.400€
(emphasis by the capacity of sold heat pumps)

Cumulative Investments in Heat Pump Systems

8 Billion €

M€

8 000

7 000

6 000

5 000

4 000

3 000

2 000

1 000

0

1976

1981

1986

1991

1996

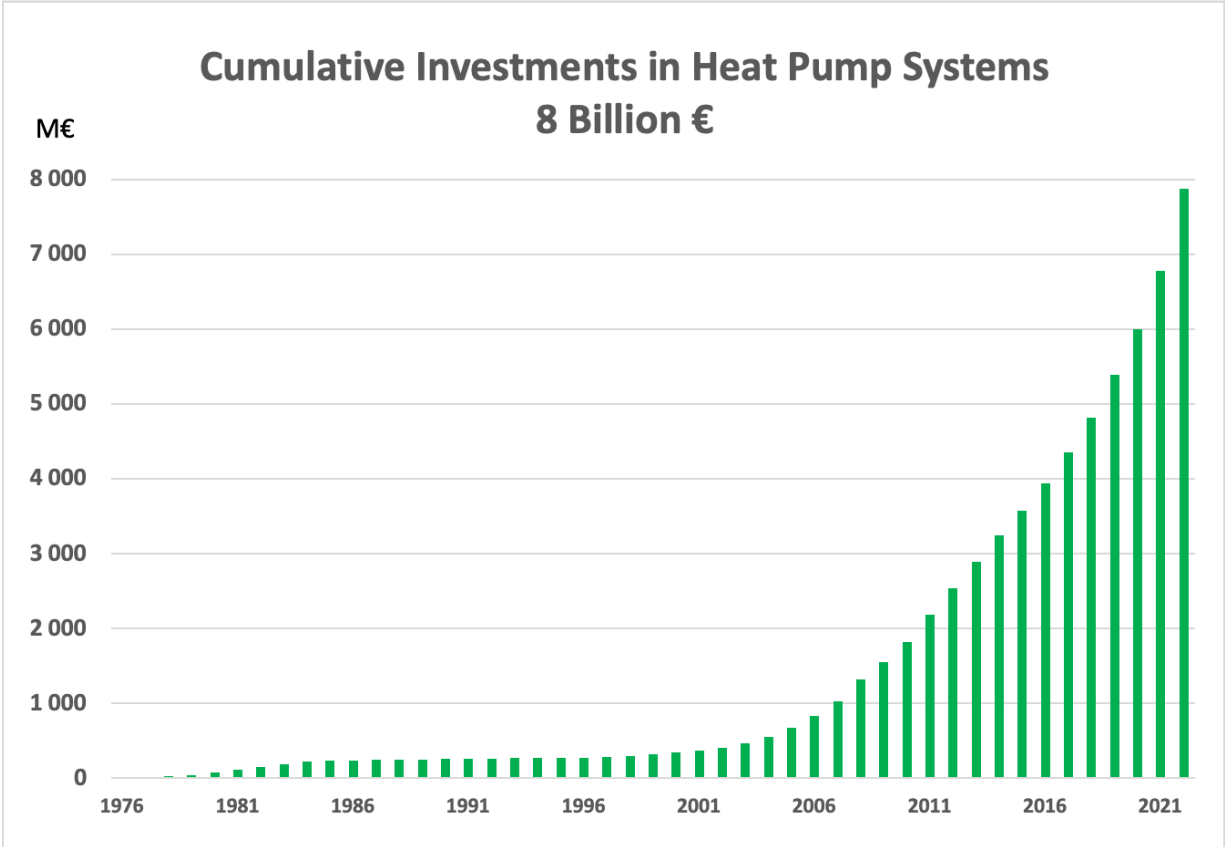
2001

2006

2011

2016

2021

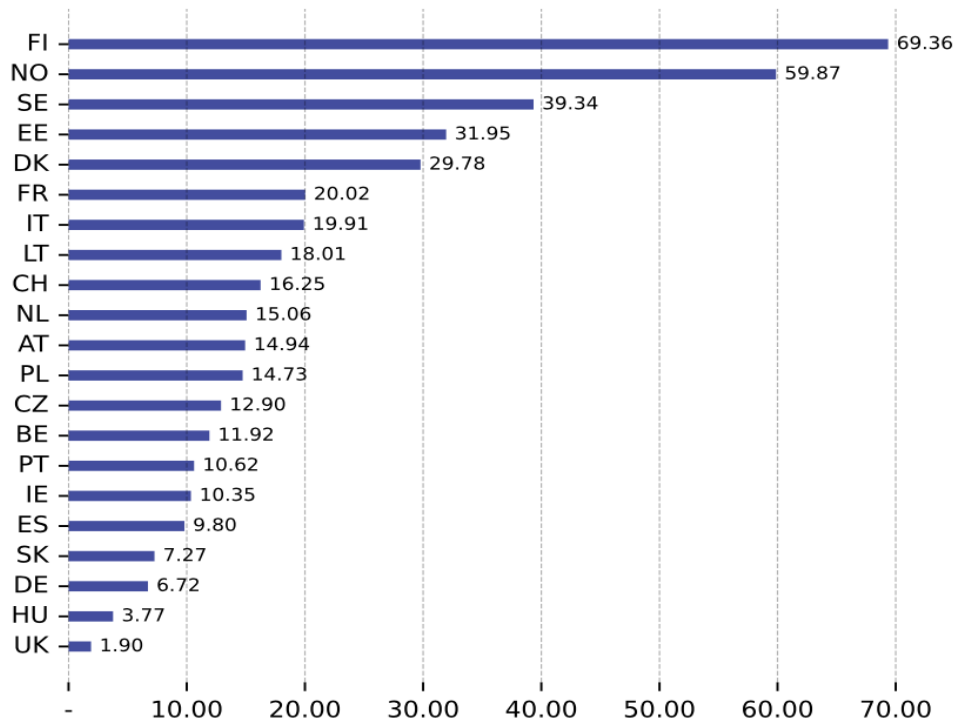


Attentions along the way

- Remember the HP investor. He decides. In the most cases it is end consumer
 - Profitabilty, communication, marketing , sales, delivery, aftersales, reputation
- Distribution chain
 - Winning concept in Scandinavia when starting the HP business has been often direct distribution: Local specialized companies with turnkey-deliveries. often without wholesaler. One local stop shop with good service.
- Business model development
 - E.g., Energy companies must come and invest more and more in decentralized HP solutions, when the competition of the heating of bigger buildings is getting tougher.

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Chart 3.1-8: Heat pump sales
2022 per 1 000 households



To do list:

- De-electrify our electric heating with HPs
- Get rid of our oil heating with HPs
- On the long run get rid of burning biomass in District Heating with HPs

=> duplicate heat production with HPs by 2030 and triplicate by 2040

Market shares of space and DHW heating (~80TWh/a)

